

What is claimed is:

1. An image generating method for rendering a three-dimensional object viewed from a predetermined viewpoint by generating an image of the three-dimensional object and writing color information on the image generated in a rendering buffer, the method comprising:

generating at least one of retouched image of the three-dimensional image by arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images within a rendering region for the three-dimensional object, the rendering region on which the three-dimensional object is projected on the basis of the predetermined viewpoint;

generating a projection image by projecting the three-dimensional object on the basis of the predetermined viewpoint; and

rendering the image of the three-dimensional object so as to reflect color information of the projection image at a part at which the retouched image is transparent by synthesizing the retouched image with the projection image.

2. The image generating method as claimed in claim 1, further comprising generating an edge image of the three-dimensional object on the basis of the predetermined viewpoint,

wherein the rendering the image of the three-

dimensional object includes rendering the image of the three-dimensional object by synthesizing the retouched image, the projection image and the edge image.

3. The image generating method as claimed in claim 1, further comprising:

setting a light source in an object space in which the three-dimensional object is provided; and

calculating shadow information of the three-dimensional object by performing predetermined rendering processing on the basis of the predetermined viewpoint and the light source set,

wherein the arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images includes determining arrangement positions at which the plurality of brush images are arranged on the basis of the shadow information calculated.

4. The image generating method as claimed in claim 3, wherein the arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images includes determining the arrangement positions for the plurality of brush images so that density of the plurality of brush images in a low brightness part is higher than density of

the plurality of brush images in a high brightness part on the basis of the shadow information calculated.

5. The image generating method as claimed in claim 3, wherein the arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images includes arranging the plurality of brush images at positions which satisfy a predetermined brightness condition within the rendering region on the basis of the shadow information calculated.

6. The image generating method as claimed in claim 5, wherein the arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images includes generating a first retouched image by arranging the plurality of brush images at positions which satisfy a first brightness condition and generating a second retouched image by arranging the plurality of brush images at positions which satisfy a second brightness condition within the rendering region on the basis of the shadow information.

7. The image generating method as claimed in claim 3, wherein the generating at least one of retouched image of

the three-dimensional image includes generating at least one of retouched image by changing brightness information of the plurality of brush images on the basis of shadow information at positions at which the plurality of brush images are arranged.

8. The image generating method as claimed in claim 1, wherein the generating at least one of retouched image of the three-dimensional image includes:

operating a normal line to a surface of the three-dimensional object; and

performing processing for determining an arrangement angle of each of the plurality of brush images on the basis of the normal line operated for a position on the surface of the three-dimensional object, the position corresponding to an arrangement position at which each of the plurality of brush images is arranged, and arranging each of the plurality of brush images at the arrangement angle determined.

9. The image generating method as claimed in claim 8, wherein the operating a normal line to a surface of the three-dimensional object includes operating the normal line to the surface of the three-dimensional object by providing a first light source for emitting light rays in a first direction crossing at a right angle with an eyes line

direction of the predetermined viewpoint and a second light source for emitting light rays in a second direction crossing at a right angle with the eyes line direction of the predetermined viewpoint, irradiating the light rays emitted from the first light source and the light rays emitted from the second light source to the three-dimensional object, executing predetermined rendering processing on the basis of the predetermined viewpoint, and generating a normal image expressing the normal line to the surface of the three-dimensional object in color information, and

the arranging each of the plurality of brush images includes performing processing for determining the arrangement angle of each of the plurality of brush images, on the basis of color information at a position of the normal image, the position corresponding to the arrangement position at which each of the plurality of brush images is arranged, and arranging each of the plurality of brush images at the arrangement angle determined.

10. The image generating method as claimed in claim 9, wherein the rendering buffer is formed so as to store RGB values for every pixel,

the operating the normal line to the surface of the three-dimensional object includes generating the normal image by setting a light ray color of the first light

source to be a first color of RGB and a light ray color of the second light source to be a second color of the RGB other than the first color, executing the predetermined rendering processing, and operating RGB values of each of pixels of the surface of the three-dimensional object, and

the arranging each of the plurality of brush images includes determining the arrangement angle of each of the plurality of brush images at the arrangement position at which each of the plurality of brush images are arranged by operating a direction corresponding to the normal line at the arrangement position at which each of the plurality of brush images is arranged on the basis of a value of the light ray color of the first light source and a value of the light ray color of the second light source of RGB values of the normal image.

11. The image generating method as claimed in claim 9, further comprising operating a direction from a predetermined position of the normal image generated to the arrangement position at which each of the plurality of brush images is arranged,

wherein the determining the arrangement angle of each of the plurality of brush images includes determining the arrangement angle of each of the plurality of brush images by synthesizing the direction operated with a direction obtained on the basis of the color information of the

normal image.

12. The image generating method as claimed in claim 8, further comprising setting a light source in an object space in which the three-dimensional object is provided;

wherein the arranging each of the plurality of brush images includes determining the arrangement angle of each of the plurality of brush images by synthesizing a light ray direction of the light source set with the normal line to the surface of the three-dimensional object.

13. The image generating method as claimed in claim 1, wherein the generating at least one of retouched image of the three-dimensional image includes generating at least one of retouched image by changing a number of brush images to be arranged according to a predetermined condition.

14. The image generating method as claimed in claim 1, wherein the generating at least one of retouched image of the three-dimensional image includes generating at least one of retouched image by changing a size of each of the plurality of brush images to be arranged according to a predetermined condition.

15. The image generating method as claimed in claim 1, further comprising storing information on the plurality

of brush images,

wherein the generating at least one of retouched image of the three-dimensional image includes generating at least one of retouched image by selecting any one brush image to be arranged of the plurality of brush images according to a predetermined condition.

16. The image generating method as claimed in claim 1, wherein the arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images includes arranging the plurality of brush images so as to superpose a part of a predetermined number of brush images of the plurality of brush images on one another part of the plurality of brush images in a predetermined direction from a position at which any one brush image of the plurality of brush images when arranging the plurality of brush images.

17. The image generating method as claimed in claim 16, wherein the arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images includes arranging the plurality of brush images so as to superpose the part of the predetermined number of brush images of the plurality of brush images on one another part in the predetermined direction based on an arrangement angle of



any one brush image of the plurality of brush images when arranging the plurality of brush images.

18. The image generating method as claimed in claim 1, wherein the generating at least one of retouched image of the three-dimensional image includes generating at least one of retouched image by shifting positions at which the plurality of brush images are arranged as time passes.

19. The image generating method as claimed in claim 1, wherein the generating at least one of retouched image of the three-dimensional image includes generating at least one of retouched image by shifting arrangement angles of the plurality of brush images as time passes.

20. A storage medium having information recorded thereon, when the information is loaded onto an operating apparatus, the information making the operating apparatus execute the method as claimed in claim 1.

21. An image generating apparatus for rendering a three-dimensional object viewed from a predetermined viewpoint by generating an image of the three-dimensional object and writing color information on the image generated in a rendering buffer, the apparatus comprising:

a retouched image generating section for generating

at least one of retouched image of the three-dimensional image by arranging a plurality of brush images so as to superpose a part of the plurality of brush images on one another part of the plurality of brush images within a rendering region for the three-dimensional object, the rendering region on which the three-dimensional object is projected on the basis of the predetermined viewpoint;

a projection image generating section for generating a projection image by projecting the three-dimensional object on the basis of the predetermined viewpoint; and

a rendering section for rendering the image of the three-dimensional object so as to reflect color information of the projection image at a part at which the retouched image is transparent by synthesizing the retouched image with the projection image.

22. A data signal embodied in a carrier wave, comprising information used for executing the method as claimed in claim 1.

23. A program, when the program is loaded onto an operating apparatus, the program making the operating apparatus execute the method as claimed in claim 1.